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Resources Canada

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CANMET

Canada Centre
for Mineral
and Energy
Technology

Centre canadien
de la technologie
des minéraux
et de l'énergie

INDEX OF MINING TECHNOLOGY PROJECTS

RÉPERTOIRE DE PROJETS EN TECHNOLOGIE MINIÈRE

1987

MINERAL AND
ENERGY TECHNOLOGY

MINING RESEARCH
LABORATORIES

LA TECHNOLOGIE DES
MINÉRAUX ET DE L'ÉNERGIE

LABORATOIRES DE
RECHERCHE MINIÈRE

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RÉPERTOIRE DE PROJETS EN TECHNOLOGIE MINIÈRE

1987

N. Billette & P. Lacourse

Mining Methods
and Evaluation Group

Groupe d'évaluation
et de méthodes minières

September 1987

Septembre 1987

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ENERGY TECHNOLOGY

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FOREWORD

In the early 1980's CANMET was requested by the National Advisory Committee on Mining and Metalurgical Research to establish a mining technology database. The database was established in 1985 and is updated annually. The 1987 Index is, thus, the third annual report. It contains all the information that has been made available to us on mining research and technological developments in Canada.

In 1987, the Mining Research Laboratories stressed participation by mining companies in the gold and industrial mineral sectors. In addition, initial contact was established with a number of coal mining operations. Besides being of interest in the sharing of common problems, the contribution of the coal mines can prove very rewarding for the other sectors of the industry facing similar problems, such as the revegetation of mine dumps.

Section One of the report lists projects by organization. Section Two divides the projects into twelve categories. The task of assigning mining activities to categories of roughly similar size has proven to be a difficult one. Consequently, many projects appear under two headings because of their descriptions or the natural links between various mining activities. Suggestions from readers on how to solve this problem of classification would be appreciated.

CANMET staff members visiting various mining operations have been struck by the unanimity of opinion concerning the usefulness of the Index, in the way in which it classifies and makes information available. However, it would be desirable to have the publication circulate more widely among the technical personnel of companies. We believe that a number of potential users currently do not benefit from this source of information.

The usefulness of CANMET's Index of Mining Technology Projects depends on the participation of the mining community. We trust that the inclination, in 1987, on the part of more and more companies to share information will continue in the future, contributing to real productivity increases and greater international competitiveness for Canada.

Finally, I would like to thank all those who have contributed to the 1987 version of the Index, and request their support and that of new contributors in the preparation of the 1988 report.

John E. Udd
Director
Mining Research Laboratories

AVANT-PROPOS

Le Comité consultatif national sur la recherche en mines et métallurgie a demandé à CANMET de mettre sur pied une banque de données sur la technologie minière. Celle-ci a été initiée en 1985 et est mise à jour annuellement. Le répertoire 1987 constitue donc le troisième rapport annuel sur la banque de données qui contient l'ensemble des informations sur la recherche et les développements technologiques en exploitation minière au Canada.

Au cours de l'année 1987, les Laboratoires de recherche minière ont accentué la participation des entreprises minières des secteurs de l'or et des minéraux industriels. De plus, des premiers contacts ont été établis avec un certain nombre d'exploitants de charbon. L'apport des mines de charbon, en plus d'être intéressante dans un but de partage de problèmes communs, peut être fort bénéfique aux autres secteurs de l'industrie qui font face à des problèmes semblables, par exemple de revégétation des terrils.

La première section du rapport regroupe les projets par organisation. La seconde assigne les projets à l'une des douzes catégories. Regrouper les activités minières en catégories relativement balancées au point de vue du nombre de projets n'est pas chose facile. Conséquemment, un bon nombre de projets apparaissent dans deux catégories à cause de leur description ou de l'interaction naturelle existant entre diverses activités minières. Les suggestions des lecteurs pour pallier à ce problème de classification seraient appréciées.

Il est remarquable de constater, lors des visites du personnel de CANMET aux diverses exploitations minières, l'unanimité des personnes rencontrées à qualifier le répertoire de fort utile dans la façon de classifier et d'accéder à l'information. Il serait cependant souhaitable que ce produit circule davantage à l'intérieur des entreprises parmi le personnel technique car plusieurs usagers potentiels sont présentement privés de cette source d'information.

L'utilité du répertoire de projets en technologie minière de CANMET dépend du degré de participation de la communauté minière. Espérons que la tendance notée en 1987 quant au partage d'informations d'entreprises de plus en plus nombreuses se poursuivra à l'avenir et contribuera à des accroissements de productivité véritables et à une plus grande compétitivité internationale du Canada.

En dernier lieu, je voudrais remercier tous ceux qui ont contribué à la version 1987 du répertoire et solliciter leur soutien, tout autant que celui de nouveaux participants, pour la préparation de la version 1988.

John E. Udd
Directeur
Laboratoires de recherche minière

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INTRODUCTION

Mines are often isolated from centres with universities, professional associations and other sources of new information. Many operators, because of the isolation, must work with only partial knowledge of new techniques, equipment or procedures that might be of great value to them. As a result they are forced, at times, to "re-invent the wheel". With increasing competition and softening metal demands such re-inventions are needless expenses to mine operators and to the national economy. Since relations between mines are usually cooperative CANMET was requested to establish an information system to facilitate communication between operators and other segments of the industry on technology development projects.

This report contains the results of the 1986 information gathering exercise. Some information was gathered by telephone conversations, some by mail and some by mine visits. A few of the mines contacted had no projects underway to improve their operations; some remained to be convinced that they could benefit from projects being carried out by other operators. Their response raises the question what is research and how does research differ from those operational improvements all mines strive for daily? For the purpose of the "Index" all research projects submitted have been included.

While no two mines are alike, all share many similarities. Staffs at many underground mines see the advantages in their mines changing from selective mining methods to bulk mining. At some mines complete changes can be made, at other mines, because of orebody configuration, only partial changes are possible. The major benefit of such changes are reduced cost through higher stope production rates and reduced stope development requirements. Other mines are trying to reduce costs by increasing production rates, redesigning materials handling systems, increasing mechanization and concentrating men in fewer work places. Whatever the specific circumstances, most operators are trying to incorporate some or all of these new concepts into their mine operations. This report outlines projects being undertaken by operators related to implementation of such concepts.

CANMET does not possess detailed information on projects contained in the "Index". For detailed information the user is directed to the contact persons listed for each project.

INTRODUCTION

Les mines sont souvent isolées des centres où sont concentrées universités, associations professionnelles et autres sources d'informations nouvelles. Dû à cet isolement, beaucoup d'opérations doivent oeuvrer avec des techniques, équipements ou procédures partiellement adaptés qui pourraient donc leur être plus profitables. Conséquemment, il faut de temps à autre "réinventer la roue". Avec l'accroissement de la compétition et la baisse de la demande pour les métaux, de telles réinventions constituent des frais superflus pour l'exploitant minier ainsi que pour l'économie nationale. Les mines désirant maintenir un niveau de coopération élevé, CANMET a été approché afin d'établir un système qui favoriserait les transferts d'information sur les projets de développement technologique d'un exploitant à l'autre et entre les différents secteurs de l'industrie.

Ce répertoire regroupe les résultats de la collecte d'informations de 1986 qui fut réalisée par téléphone, courrier et visites aux mines. Quelques mines contactées n'avaient pas de projets en cours pour améliorer leur exploitation; quelques autres ne purent être convaincues des bénéfices que pourraient leur apporter les projets réalisés ailleurs. Leur réponse soulève la question: qu'est-ce que la recherche et comment diffère-t-elle des améliorations opérationnelles que chaque mine doit envisager quotidiennement? Aux fins de ce répertoire, tous les projets soumis ont été inclus.

Il n'existe pas deux mines identiques, mais elles partagent toutes certaines similitudes. La direction de plusieurs mines souterraines voit l'avantage de changer d'une méthode de minage sélective à une méthode en vrac. Il est possible de modifier complètement les méthodes à certaines mines; par contre, à d'autres endroits, la configuration du gisement ne peut le permettre que partiellement. Le bénéfice principal qui découle de telles modifications provient de la réduction des coûts suite à une production accrue et une réduction des travaux de développement. D'autres mines essaient de diminuer les coûts en augmentant le taux de productivité, en modifiant les systèmes de manutention des matériaux, en augmentant la mécanisation et en réduisant le nombre de zones de travail afin de concentrer le personnel. Quelles que soient les circonstances particulières, la majorité des mines essaient d'incorporer un ou plusieurs de ces concepts à leurs opérations. Ce rapport regroupe les projets en fonction des responsables de leur déroulement.

CANMET ne possède pas d'information détaillée sur les projets inclus dans ce répertoire. Pour de plus amples informations, le lecteur devra contacter la personne responsable du projet.

SECTION 1

Projects Listed by Organization

Liste des projets par organisation

Afton Operating Corporation	George Thornton
P.O. Box 937	Chief Engineer
KAMLOOPS, B.C.	(604) 374-5022
V2C 5N4	

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Ajax zone mine feasibility study.	2

Brenda Mines Limited
Brenda Mine
P.O. Box 420
PEACHLAND, B.C.
V0H 1X0

Jim A. Currie, P. Eng.
Chief Mine Engineer
(604) 763-3220

	PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1.	Geostatistical ore reserve modelling for diamond drill and blast hole drill assays with computer graphic and plotter displays.	3
2.	Computerized radio telemetry slope monitoring system for strain gauges and extensometer monitoring.	10
3.	Update interactive short to long range planning system for use on IBM-PC/AT workstation.	4, 11
4.	Reclamation work on tailings dam and waste dumps including re-sloping and seeding.	3
5.	Computerized surveying system for EDM using Autocad to update mine plan and store survey pick-ups.	4, 11

Byron Creek Collieries
Coal Mountain Operations
P.O. Box 1960
SPARWOOD, B.C.
V0B 2G0

Arquimides Perez
Mine Engineer
(403) 562-2837

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Use of unconsolidated runoff material in coal waste dump reclamation.	3
2. Restoration of coal refuse storage sites.	3
3. Waste dump height determination as a function of reclamation and haulage costs.	3, 4
4. Waste handling by conveyors: an alternative study for traditional truck haulage.	8
5. Coal dust suppression at the thermal dryer using chemical sprays.	9, 1

Canada Tungsten Mining Corporation Ltd.
P.O. Box 9
TUNGSTEN, N.W.T.
X0H 0A0

J.C. Devitt
Mine Manager
(403) 777-2345

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Tailings backfill dewatering.	10
2. VCR ore extraction.	4, 7

Cominco Limited
Polaris Mine
POLARIS, N.W.T.
X0A 0Y0

Ron S. Simkus, P. Eng.
General Superintendent
(819) 253-6001

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
C.N. Zahovskis (819) 253-2235	
1. Pillar mining at Polaris using frozen backfill.	7, 10
2. An evaluation of "tightfill" placement techniques.	10
3. Cable bolting techniques in permafrost.	10

Cominco Limited
Sullivan Mine
P.O. Box 2000
KIMBERLY, B.C.
V1A 2G3

R. Hargrave
General Manager
(604) 427-2271

	PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1.	Continuing research on explosives and explosives technology.	7
2.	Methods to stabilize permafrost.	3
3.	Mechanical mining machines: shafts, raises, drifts.	5
4.	Control of diesel emissions.	9
5.	Introduction of fire resistant hydraulic fluids.	5, 1
6.	Leaky cable underground communication system.	1
7.	Underground computer terminals for shift boss reporting.	1
8.	Field testing 4.5 inch and 3.5 inch in-the-hole up-hole drilling system.	7, 5
9.	Develop a lift check device to lock scooptram dump and roll cylinders.	5, 1
10.	Shotcrete cable bolts and applications.	10
11.	Cermet bit inserts for gauge buttons.	5, 11
12.	Explosives customizing to give greater gap sensitivity and less power for perimeter blasting.	5, 10

Fording Coal Limited
P.O. Box 100
ELKFORD, B.C.
V0B 1H0

A. Brown
Superintendent, Mining
(604) 865-2271

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Short range planning model.	11, 4
2. Demonstration and evaluation of blast casting in a producing Canadian surface coal mine.	7
3. Evaluation of various methods of resloping large coal mine waste dumps to allow for final revegetation.	3
4. The long-term use of flow-through rock drains in coal mine waste dumps.	3

D.J. Schyluk (403) 264-1063

1. Coal utilization for enhanced oil recovery.	12, 11
2. EPRI/ARC coal oil agglomeration research program.	11, 12
3. Determining geotechnical& hydrogeological properties of overburden in oil sands mining using downhole geophysics.	3

Giant Yellowknife Mines Ltd.
Giant Mine
P.O. Bag 3000
YELLOWKNIFE, N.W.T.
X1A 2M2

S.E. El-Alfy, P.Eng.
Chief Engineer
(403) 873-6301

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Hydraulic reclaim using E.C.C. water monitors and slurry pumps to recover gold from refractory tailings deposited on surface over 39 years of operation.	2, 12

Highland Valley Copper
P.O. Box 1500
LOGAN LAKE, B.C.
V0K 1W0

W.K. Munro
Chief Mine Engineer
(604) 575-2443

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Haulage truck fuel efficiency study.	5
2. Shovel payload weighing system.	5, 11
3. Computerized mine maintenance.	9, 11
4. Computer assisted truck dispatch.	8, 11
5. Rock grinding index.	12
6. Rubber truck box.	5
7. Heap leaching/solvent extraction.	12
8. Overburden dewatering.	3
9. Tailings dam construction.	3
10. Lake dewatering.	3

Nanisivik Mines Ltd.
P.O. Box 225
NANISIVIK, N.W.T.
X0A 0X0

G.G. Clow
Mine Manager

PROJECT TITLE TITRE DU PROJET		CATEGORY CATÉGORIE
S.R. Blaho	(819) 436-7376	
1. Continuing development of mining techniques in ice and permafrost.		4
2. Removal of high (over 20 m) post-pillars from an existing open room and pillar stoping area (equipment and ground control considerations).		4, 5
John Goyman	(819) 436-7472	
1. Improving metal recoveries of partly oxidized sulphide ore using organic reagents.		12
E. Hache	(819) 436-7383	
1. The recovery and secondary use of waste heat from a 10 MW diesel generating plant.		9
2. Methods of reducing power consumption in underground mines including the use of centralised control of motors.		9
J. Markle	(819) 436-7266	
1. Concrete design and construction methods in arctic conditions.		3

Pine Point Mines Ltd.
P.O. Bag 2000
PINE POINT, N.W.T.
X0E 0W0

Ken Carter
Mine Manager
(403) 393-2811

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Total station survey instruments interfaced with a computer system.	9, 11

Westar Mining Ltd.
Greenhills Operations
P.O. Box 4000
ELKFORD, B.C.
V0B 1H0

Don Parsons
Project Engineer
(604) 865-4621

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Tailings dam construction.	3
2. Shovel/truck load weighing systems.	5
3. Rotary breaker reject crushing and feeding to the preparation plant for coal processing.	2, 12
4. Ground stability of a moderately dipping coal seam footwall.	10
5. Use of a conveyor system to transport raw coal from the pit areas to the breaker station.	5, 8
6. Interactive short and long term open pit computer mine planning system.	4
7. Assessment of computer assisted truck optimization systems.	4, 5

Westmin Resources Limited
Myra Falls Operations
P.O. Box 8000
CAMPBELL RIVER, B.C.
V9W 5E2

C. De Seta
Planning Engineer
(604) 287-9271

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Sub-level retreat mining with waste fill.	7, 10
2. Mining 30° dip orebodies with trackless equipment.	4, 5
A. Chance	
1. The influence of rock mechanics considerations on mine design and short and long term stability.	4, 10
R. Van Dyk	
1. Sub-aerial tailings deposition.	3, 5

Cigar Lake Mining Corporation
410-224 Fourth Avenue S.
SASKATOON, Saskatchewan
S7K 5M5

G.A. Peebles
General Manager
(306) 665-2628

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Underground testing of a mining method for a very high grade uranium deposit.	4

Cominco Limited	R.M. Henningson
Vade Mine	Mine Manager
VANSCOY, Saskatchewan	(306) 668-4343
S0L 3J0	

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Field and laboratory testing, field measurements and numerical modelling of excavations in potash.	4, 10

Hudson Bay Mining and Smelting Co. Ltd.
Snow Lake Operations
P.O. Box 1500
FLIN FLON, Manitoba
R8A 1N9

Brig Sigismund
Chief Mine Engineer
(204) 687-5230

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Bacterial-Leach assisted mining.	4, 12
2. Tertiary recovery adjacent to unconsolidated backfill.	7
3. Mine design CADD system.	4, 11
4. Mining method selection, blast design and layout for flat dipping orebody.	4, 7
5. Delayed backfill consolidation.	10

Inco Limited
Manitoba Division
THOMPSON, Manitoba
R8N 1P3

W.R. Niemi
Superintendent Research
(204) 677-5211

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Evaluation of non-destructive mine shaft rope testing devices.	5
2. Overburden stabilization.	3, 7
3. Sound and vibration suppression on compressed air equipment (jacklegs and stopers).	1, 5
4. Four inches sandfill butterfly valve.	5
5. Drawpoint pneumatic barricade bags.	5, 10
6. Polyurethane applications for material and equipment in the underground environment.	5

J.M. Fulton

1. Mine waste heat recovery.	3

International Minerals
and Chemical Corporation (Canada) Ltd.
Potash Division
ESTERHAZY, Saskatchewan
S0A 0X0

Glenn Nicol
Chief Engineer
(306) 745-3931

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Study of overburden movement and pillar behavior in extracted areas.	10
2. Seismic monitoring.	10
3. Input parameters for numerical modelling of potash strata.	10, 4

Central Canada Potash
P.O. Box 1500
COLONSAY, Saskatchewan
S0K 0Z0

Dr. A.M. Coode
Chief Mine Engineer
(306) 944-2170

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. A field test program to evaluate the use of waste salt backfill in Saskatchewan potash mines.	10
2. A computer system to predict subsidence related to potash mining for use on IBM AT's.	10, 11
3. Triaxial creep test of Saskatchewan potash mine sylvinite.	10
4. Basic research into the control of brines around underground bulkheads in Saskatchewan potash mines.	10
N.P. Crocker	
1. Assessment of longevity of grouts used underground in Saskatchewan potash mines.	10
W.C.H. Kruining	
1. Recirculation of exhaust air in potash mines.	9

Potash Corporation of Saskatchewan
PCS Tower, Suite 500
122- 1st Avenue South
SASKATOON, Saskatchewan
S7K 7G3

J.B. Vance
Senior Mine Engineer
(306) 652-2699

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Mine automation.	11
2. Alternative mine air heating.	11 9
3. The reduction of friction and wear in mining machinery.	5
4. Commissioning of an automated ore grade monitoring system.	11
5. Monitoring of microseismic activity.	10
P. Mottahed	
1. Potash cutting technology: basic research of the mining machine cutting elements.	5

Sherritt Gordon Mines Ltd.	K.D. Ball
Ruttan Operation	Manager
P.O. Box 1000	(204) 473-2415
LEAF RAPIDS, Manitoba	
R0B 1W0	

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Communication system for isolated areas in mines.	1, 9
2. Secondary recovery of base metals by in-place leaching.	12

Tantalum Mining Corporation
of Canada Limited
P.O. Box 2000
LAC DU BONNET, Manitoba
R0E 1A0

R.A. Simard
Mine Superintendent
(204) 345-8658

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Stress analysis resulting from pillar reduction in room & pillar mining utilized to establish new pillar pattern.	7, 10
2. Comparative button bit studies to determine the most appropriate $1\frac{3}{4}$" rock bit for spodumene ore.	5, 7

Campbell Red Lake Mines Ltd.
P.O. Box 10
BALMERTOWN, Ontario
P0V 1C0

Tony Makuch
Senior Ground Control Engineer
(807) 735-2075

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Microseismic monitoring.	10, 11
2. Mine wide seismic monitoring system for determining mechanisms of rockbursts.	10, 11
3. Rockbursts in sill and crown pillars; underground stress measurements to determine influence of backfill.	10, 11
4. Design of a new ventilation system.	9
5. Microcomputer based core logging system.	3
6. Microcomputer based survey calculation system.	9
7. Use of data collector for underground survey and integration to an IBM-AT surveying program.	9, 11
8. Computerized production of geological plans for use by shiftbosses.	9, 11
9. Destressing pillars for crown mining.	7, 10

Campbell Red Lake Mines Ltd.
Detour Lake Mine
130 Wilson Avenue
TIMMINS, Ontario
P4N 2S9

G. Alexa
Personnel and Support Services Supt.
(705) 245-3211

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Experiences with a remote fly-in mining operation.	1

Denison Mines Limited
Elliot Lake Operations
P.O. Box B-2600
ELLIOT LAKE, Ontario
P5A 2K2

Peter Townsend
Chief Industrial Engineer
(705) 461-6138

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Continuing search for and development of low profile (6.5 feet) mining equipment.	5
2. Development of a mining method for recovering pillars adjacent to delayed fill stopes.	7
3. Continuing program of large-scale underground testing of bacterially assisted leaching methods.	12
4. Testing methods for mining, drying and conveying high grade fines recovered from sumps.	5, 8
5. Use of consolidated fills for controlling violent pillar failures.	10
6. Evaluation of hydraulic drifters and feed rails.	5
7. Evaluation of aluminum body jacklegs.	5
8. Testing and development of 45 mm button bits.	5
9. Development and installation of portable underground concrete batch plant.	5
10. Development of survey data entry, calculation and plotting.	9, 11

Dome Mines Limited
SOUTH PORCUPINE, Ontario
P0N 1H0

R.J. Perry
General Manager
(705) 235-3221

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Additive binders for cohesion and water reduction in dense fills.	10
2. Development and verification of computerized cut-and-fill panels design.	4, 10
3. Refinement of placement techniques for paste fills.	8, 10

Domtar Inc.
Sifto Salt Division
Goderich Mine
North Harbour Road
P.O. Box 370
GODERICH, Ontario
N7A 4C6

D. Bray
Manager Maintenance, Planning & Eng.
(519) 524-8351

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Ground control research and testing.	10
2. Mechanical scaling.	5
3. Vacuum-Blower unit.	9

Falconbridge Limited
ONAPING, Ontario
P0M 2R0

Stan Bharti
Supt. Mines Technical Services
(705) 966-3411

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Improving hole accuracy of in-the-hole drilling through use of stabilizers and better machine alignment.	5
2. Improving productivities in cut-and-fill stopes through mechanized bolting and scaling.	5, 7
3. Pillar recovery in blasthole stopes against consolidated hydraulic fills.	7
4. Improvement of fill placement techniques to reduce cement content, segregation and dilution during pillar recovery.	10
5. Use of paste fills and other high modulus fills, state-of-the-art studies in progress.	10, 11
6. Use of microseismic monitoring at all the mines and linkage to a central control room for continuous monitoring on a 24-hour basis.	10, 11
7. Rockburst studies at Strathcona Mine jointly with CANMET and the Ontario government with emphasis on fault slip behaviour.	10
8. Development of 2-D and 3-D numerical modelling programs using the Distinct Element approach.	10, 11
9. Blast vibration monitoring in blasthole stopes when mining against backfill.	10, 9
10. Selection and development of a geological database system for ore reserve calculations.	3, 11
11. Computerized surveying systems.	9, 11
12. Computer aided design for optimum mine planning.	4, 11

13.	Trials with a mechanized scaling machine and a mechanized bolter/screener.	5
14.	Establishing a central control room at Strathcona for hoists and other materials handling functions.	8, 9
15.	Development of a tunnelboring machine for hardrock (HDRK project).	6, 5
16.	Design of cablebolts in cut-and-fill and blasthole stopes (Project jointly with AMIRA in Australia).	10
17.	Mechanized cablebolter for drilling and installing fully grouted cables in stope backs and walls at Fraser Mine.	5
18.	Hydraulic hoisting of -3" ore up 2260 ft. at Onaping Mine (HDRK Project).	5, 8

Inco Limited
Ontario Division
COPPER CLIFF, Ontario
P0M 1N0

J.G. Kelly
Manager Mines Research
(705) 682-5261

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Testing of “double-decked” crater blasting.	7
2. Microseismic monitoring.	10, 11
3. Investigation of iron ore blast furnace slag as a binding agent for fills.	10
4. Development of a 3-D numerical modelling system for rock mechanics.	10, 11
5. Jointly developing, with Spar Aerospace, remote controlled underground equipment to screen and bolt in recently blasted areas.	5, 11
6. High density fill.	8, 10
7. Continuous mobile ore removal system.	5, 8
8. 70 ton electric automated haulage truck.	5
9. The viability of blind shaft boring.	5, 6

Kidd Creek Mines Limited
P.O. Box 2002
TIMMINS, Ontario
P4N 7K1

T.R. Yu
Chief Engineer Mining R&D
(705) 267-2161

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Loose rock sensing system for mechanized scaling.	5, 11
2. Two studies for using water under pressure for mining applications; one for cutting and slotting and one for secondary breakage.	7, 11
3. Pozzolanic property of Cu/Ni ground slag.	10
4. Phase II of a project to improve underground communication.	1
5. Implementing hydro-static drive of ST-8 Scooptram.	5
6. Mechanization of passive ground support system.	5, 10
7. Remote control for rockbreaking machines.	5, 11
8. Mechanized excavation in consolidated rockfill.	5, 7

LAC Minerals Limited
Macassa Division
P.O. Box 550
KIRKLAND LAKE, Ontario
P2N 3J7

Hans de Ruiter
Area Engineer
(705) 567-5208

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Ventilation modifications : installation of three centrifugal fans.	9
2. Mine monitoring and control system for pumps, fans and heating system.	9, 11
3. Sprinkler system in#3 shaft in order to prevent the shaft timber from drying out.	9
4. Tailings reclamation using dredging and dry excavation.	3, 8
5. Installation of microseismics system to monitor rock bursts.	10, 11
6. Testing feasibility of replacing post in timbered drifts with cable slings.	2, 10
7. Longhole mining in narrow veins.	7
8. Waste heat recovery.	9
9. Cemented rockfill.	10
10. Auxiliary ventilation with centrifugal fans.	9

Lac Minerals
Page-Williams Division
P.O. Bag 500
MARATHON, Ontario
P0T 2E0

S.T. Brown
Chief Engineer
(807) 238-1100

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Testing a 3% cement and 2% flyash mix to bind a minus 5 inch crushed rock backfill.	10
2. Installing an automated cemented crushed rock backfill system for one man control and operation.	8, 10
3. Upgrade mine hoisting system to 6000 TPCD ore.	5, 8
4. Install and commission a gyratory crusher.	8, 12
5. Install and commission u/g radio communication.	1
6. Test a continuous loading system.	5, 8
7. Install and commission a slimes handling system for underground.	8, 9
8. Test a hydraulic longhole production drill.	5, 7
9. Test a high pressure (350 psi) ITH booster compressor for production stoping.	5, 7
10. Upgrade mine ventilation to 1,000,000 cfm.	9

Noranda Inc.
Lyon Lake Mines Ltd.
P.O. Box 190
IGNACE, Ontario
P0T 1T0

Manfred Lengwenus
Mine Superintendent
(807) 934-2291

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Remote scoop retrieval system.	5, 11

Pamour Inc.
No. 1 Mining Operation
P.O. Bag 2010
TIMMINS, Ontario
P4N 7X7

Michael Lalonde
Mine Manager
(705)235-3311

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Dust collector using geotextile material and ultrasonic water sprays.	9
2. Large scale heap leaching of low grade ore.	3, 12

Renabie Gold Mines Ltd.
General Delivery
MISSANABIE, Ontario
P0M 2H0

Dejan Polak
Planning & Production Supt.
(705) 234-2333

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Constructing an underground air receiver from a 460 foot exploration drift on the 3100 level.	9
2. Equip the No. 2 shaft hoist with a pinion brake.	5, 9
3. Install a second drive motor to the winze hoist.	5, 9
4. Sub-level open stoping being introduced on 4105 level.	4
5. Sub-level caving will be started below 3510 level.	4

Rio Algom Limited
Elliot Lake Operations
P.O. Box 1500
ELLIOT LAKE, Ontario
P5A 2K1

S.N. Muppalaneni
Superintendent Mining Services
(705) 461-4325

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Direct data entry by front line supervisor.	1, 11
2. Evaluation of computerized survey calculations.	9, 11
3. Scoop modification for 6-way bulldozer blade.	5, 8
4. Underground radio communications.	1, 11
5. Low profile two boom hydraulic drill jumbo's.	5
6. Raise elevators.	5, 9
7. Deep level conveyor hoisting from several loading points with grizzlies and rock breakers.	5, 8
8. Containerized materials handling.	5, 8
9. Low profile roofbolting and screening platform.	5, 10

Eric N. DuRussel

1. Development of trailer for the movement of large underground equipment.	5

The Algoma Steel Corporation Ltd. Algoma Ore Division WAWA, Ontario P0S 1K0	A.L. Stevens Mine Manager (705) 856-4620

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
T.E. Landers	
1. Computerized tracking of mine ores and grades.	4, 11

JM Asbestos Inc.
Asbestos Fibre Division
Jeffrey Mine
C.P. 1500
ASBESTOS, Québec
J1T 3N2

G. Bernard Coulombe
Mine Manager
(819) 879-5431

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Rock bolting open pit walls.	10
2. Installation and evaluation of 20 foot stressed cable bolts in pre-sheared pit walls.	10
3. Remote control of primary crusher operation.	11, 12
4. Remote surveillance of the central air and steam plant operation.	11
5. Mesure des mouvements verticaux d'un banc par nivellement hydraustatique.	4, 10
6. Remote surveillance of plant entrances.	1, 9
7. Program to eliminate product contamination by improved housekeeping practices.	12
8. Programmable controller for packaging operation.	12
9. Étude statistique du contrôle de qualité.	12
10. Méthode statistique de contrôle de procédés.	11, 12
11. Informatisation de la conception et planification.	4, 11
12. Modélisation géostatistique d'un gisement d'amiante.	3
13. Automatisation de la lecture des inclinomètres.	10, 11
14. Plan de la nappe phréatique entourant le gisement.	3
15. Étude de faisabilité d'un rideau d'étanchéité pour réduire les venues d'eau.	2, 10

LAB Chrysotile inc.
835, rue Mooney
C.P. 459
THETFORD-MINES, Québec
G6G 5T5

Gaston Verreault
Vice-président
(418) 338-7500

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Étude de productivité des opérations d'une mine à ciel ouvert en fonction de la fragmentation du roc et du coût des explosifs.	2, 7
2. Robotisation de l'empilage des sacs d'amiante.	11, 12
3. Étude de contrôle des ensacheuses par ordinateur.	11, 12

Jean-Yves Blanchet

1. Études de soutènement pour accentuer les pentes finales des mines à ciel ouvert.	10
2. Études des différentes alternatives de drainage du mur est de la mine Black Lake.	3, 11

André De Guise

1. Traitement des eaux souterraines pour réduire les besoins de bassins de décantation et évacuer les boues.	3, 9
2. Opération simultanée de 2 marteaux-piqueurs contrôlés par un seul opérateur.	5
3. Robotisation des chargeuses-navettes (scooptrams).	5, 11

André Duclos

1. Optimisation des sautages primaires à l'aide d'un micro-ordinateur. 7

Pierre Laroche

1. Développement de grades d'amiante chrysotile de remplacement. 1, 12

Aristide Leclerc (418) 338-7506

1. Sous-programme d'ordinateur (intégré au programme actuel) pour suggérer au répartiteur la destination optimale d'un camion libre dans une mine à ciel ouvert. 1, 11

Luc Michel

1. Revégétation des haldes à résidus miniers et application des boues provenant des eaux usées d'une usine d'épuration. 3, 8

Lionel Poulin (418) 338-7500

1. Design de puits optimal et planification minière par micro-ordinateur. 4, 11

Les Explorations Muscocho ltée
Mine Montauban
C.P. 10
MONTAUBAN, Québec
G0X 1W0

F.A. Johnson
Directeur
(418) 336-2777

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Dimensionnement de piliers et chantiers.	4

Les Mines d'Or Kiena limitée
C.P. 9000
VAL D'OR, Québec
J9P 6A5

R. Lacerte
Ingénieur chef
(819) 738-4031

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Scaler machine in underground mine.	5
2. Tunnel boring machine.	5, 6
3. Addition of flocculant in mine backfill.	10, 11
4. Communication systems for underground workers.	1
5. Addition de cendres (fly ash) au remblai pour réduire la proportion de ciment.	10
6. Échangeur de chaleur entre l'entrée et la sortie de l'air de la mine.	9
7. Simulation du réseau de ventilation sur micro-ordinateur.	9, 11

Les Mines d'Or Malartic
Hygrade (Canada) ltée
C.P. 999
MALARTIC, Québec
J0Y 1Z0

Charles-H. Bélanger
Ingénieur
(819) 757-4351

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Régulateur d'énergie programmable.	9, 11
2. Récupération de la chaleur à partir d'un radiateur de compresseur.	9

Les Mines Seleine inc. Leslie, Grosse-Île C.P. 60 ÎLES-DE-LA-MADELEINE, Québec G0B 1M0	D. Gagnon Ingénieur en chef (418) 985-2931

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Rock mechanics computer simulation model.	10, 11

Les Mines Sigma (Québec) Limitée
VAL D'OR, Québec
J9P 4N8

Marc-G. Tremblay
Surintendant général
(819) 825-4182

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Purchase of computer equipment as well as consistent software in mining.	4, 5
2. In situ stress measurement in 1305-W drift.	6, 10
3. Fabrication d'un jumbo hydraulique électrique à petit diamètre ($1\frac{1}{2}$ à $1\frac{5}{8}$ ") à partir de composantes déjà existantes.	5
4. Conversion électrique (25 à 60 Hz).	9
5. Paramètres structuraux d'un pilier de surface par géophysique.	10
6. Mini-foreuse longs-trous électrique - hydraulique.	5
7. Expansion de notre système d'ordinateur (concentrateur et mine).	11
8. Expérimentation avec des arches d'acier pour maintenir des galeries dans la méthode coupe-et-remblai.	7, 10
9. Séquence de minage des réserves dans un secteur sujet à des coups de terrain.	4
10. Influence des paramètres climatiques sur les problèmes de "pompage" du ventilateur principal.	5, 9

Les Ressources Camchib ltée
C.P. 3400
CHIBOUGAMAU, Québec
G8P 2K9

Enriko Boiocchi
Directeur
(418) 748-2625

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Évaluation d'une mini chargeuse-navette électrique (80 cm de large).	5, 8
2. Approfondissement du puit de Cedar Bay (1455') et installation d'une nouvelle salle d'extraction.	6, 9
3. Projet "Lac Chib" : forage de 2 trous de surface de 6800 pieds chacun.	2, 3

Les Services TMG (NIOBEC) inc.
Chicoutimi Mine
3400, Chemin du Colombium
C.P. 70
ST-HONORÉ, Québec
G0V 1L0

M. Rodrigue
Directeur
(418) 673-4694

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Amélioration du système de lumière de circulation dans les rampes.	1, 9
2. Échantillonnage des boues de forage permettant une meilleure définition des teneurs dans les chantiers.	3, 9
3. Bavettes sur foreuses de 4.5 pouces de diamètre pour réduire le brouillard.	1, 5
4. Modification des sièges et suspension sur les chargeuses-navettes et camions de halage pour prévenir les maux de dos.	1, 5
5. Entretien en continu des chemins et contrôle des venues d'eau au toit et dans le plancher.	9
6. Programme d'entretien préventif de l'équipement diesel souterrain.	5, 9

Minerais LAC limitée
Division Bousquet
C.P. 1180
MALARTIC, Québec
J0Y 1Z0

Gilles Brousseau
Surintendant de la mine
(819) 759-3631

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Swellex bolts.	10
2. Machine à avance en continu (continuous miner).	5
3. Evaluation et utilisation du système de laçage par câble (cable lacing) comme alternative au support par cadres d'acier.	10
4. Essai d'un système de chargement en vrac pour émulsions dans des trous de petit diamètre.	5
5. Essai de foreuse "Roger" pour forage de monterie à petit et moyen diamètre.	5

Minerais LAC limitée
Division Est-Malartic
C.P. 1150
MALARTIC, Québec
J0Y 1Z0

M. Lanouette
Chargé de projet

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Contrôle en continu des valeurs aurifères.	3, 12
2. Thiourée : techniques d'utilisation et contrôle.	12

Mines d'Or Lac Bachelor inc.	Benoit St-Pierre
DESMARAISVILLE, Québec	Directeur
J0Y 1H0	(819) 753-2521

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Travail sur échantillonneur, à la décharge du convoyeur no 4, pour comparaison avec la teneur calculée au raffinage.	3, 12

Minnova inc.
Division Lac Dufault
C.P. 2000
NORANDA, Québec
J9X 5B4

Véronique Falmagne
Ingénieur en chef
(819) 762-7783

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Implantation d'un programme de mécanique des roches pour déterminer la méthode de minage d'un gisement à grande profondeur.	10
2. Informatisation des tâches telles le dessin, l'arpentage et le dynamitage ainsi que la ventilation et les rapports de production.	9, 11

Minnova inc.
Division Lac Shortt
C.P. 539
CHAPAIS, Québec
G0W 1H0

Laval Gilbert
Chef ingénieur
(819) 753-2571

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Étude comparative de productivité et de performance d'une foreuse électrique-hydraulique à une flèche et d'une foreuse pneumatique à trois flèches.	5, 7

Minnova inc.
Division Lac Dufault
C.P. 2000
NORANDA, Québec
J9X 5B4

Véronique Falmagne
Ingénieur en chef
(819) 762-7783

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Implantation d'un programme de mécanique des roches pour déterminer la méthode de minage d'un gisement à grande profondeur.	10
2. Informatisation des tâches telles le dessin, l'arpentage et le dynamitage ainsi que la ventilation et les rapports de production.	9, 11

Minnova inc.
Division Lac Shortt
C.P. 539
CHAPAIS, Québec
G0W 1H0

Laval Gilbert
Chef ingénieur
(819) 753-2571

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Étude comparative de productivité et de performance d'une foreuse électrique-hydraulique à une flèche et d'une foreuse pneumatique à trois flèches.	5, 7

Minnova inc.
Division Opémiska
C.P. 10
CHAPAIS, Québec
G0W 1H0

Michel Garon
Gérant de la mine
(418) 745-2501

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Etude de faisabilité de télécommande sur Cavo 310 et 320.	5, 11
2. Utilisation de laser pour arpentage en continu de longues galeries.	9, 11

Noranda inc. Division Matagami MATAGAMI, Québec J0Y 2A0	Jean-Pierre Chauvin Ingénieur en chef des mines (819) 739-2511

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Installation d'un système microséismique à la mine Norita pour permettre l'exploitation maximale du gisement de façon sécuritaire.	10, 11
2. Mise en valeur du projet Isle-Dieu : étude d'un système entièrement électrique.	2, 6

QIT-Fer et Titane inc.
Lac Tio
951, boul. de l'Escale
C.P. 160
HAVRE ST-PIERRE, Québec
G0G 1P0

Jean-Pierre Roy
Surveillant technique minière
(418) 538-3317

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Utilisation du logiciel de planification minière PC-Mine.	4, 11
2. Modélisation numérique des dépots pour permettre l'optimisation des réserves et un meilleur contrôle sur la teneur.	3, 11

Québec Cartier Mining Company
PORT-CARTIER, Québec
G5B 2H3

Raynald Fournier
Director Engineering and Research
(418) 768-2274

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Élaboration d'un modèle de gestion des stocks de concentré et boulettes au port.	8, 11
2. Trous de drainage périphérique pour abaisser la nappe phréatique et installation d'un système de contrôle du mouvement des murs en continu.	3, 10
3. Fine iron recovery.	12
4. Programme de gestion et de contrôle de l'usine des rails.	1

Brunswick Mining and
Smelting Corporation Ltd.
Mining Division
P.O. Box 3000
BATHURST, N.B.
E2A 3Z8

F.W. Hermann
Senior Project Engineer
(506) 546-6671

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Development of a mine services software system.	1

Denison-Potacan Potash Company
P.O. Box 5005
SUSSEX, N.B.
E0E 1P0

D.C.E. Waugh
Superintendent of Engineering
(506) 839-2146

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Rock mechanics instrumentation for an underground potash mine utilizing backfilling operations.	10
2. Use of backfill in potash mining (modelling).	10, 11
3. Use of backfill in potash mining (laboratory and in-situ testing).	10
4. Testing a non-rotating balance rope with plastic filled valleys.	9
5. Testing plastic coated rub ropes in the service shaft.	9
6. Developing computer software for complete mine design and planning.	4, 11
7. Designing a brine pumping system to handle the 6 to 10% moisture expected to drain from backfill.	4, 5
8. Pneumatic stowing for transporting salt backfill.	8

Gordex Minerals Ltd.
177 King Street E.
P.O. Box 7071, Station A
SAINT JOHN, N.B.
E2L 4S5

H.E. Pawson, P.Eng.
President
(506) 633-2088

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Develop a better technique to treat gold ore in a particular climate based on vat leaching technology.	12

East Kemptville Tin Corporation
East Kemptville Mine
P.O. Box 6 .
EAST KEMPTVILLE, N.S.
B0W 1Y0

D. Grégoire
Mine Superintendent
(902) 761-2311

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Pay scheme, based on training and job rotation, of the man carrying the rate not the job.	1
2. Replacing slurry explosives with an AN/FO and emulsion mixture for use in wet holes.	7

University of British Columbia
Department of Mining and
Mineral Process Engineering
Forward Building
6350 Stores Road
VANCOUVER, B.C.
V6T 1W5

Dr. George W. Poling
Head
(604) 228-3981

C. Brawner (604) 228-2540

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Linkage algorithm for finite element/boundary integral methods for specific rock mechanics and underground mining applications.	10
2. Pillar strengthening with grouted untensioned rebar or bolts.	10
3. Pit slope stability mining through underground slopes.	10
4. Development of buckling failure analysis.	10

Dr. A.E. Hall

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Recirculation of mine ventilation in order to decrease heating costs.	9
2. Coal blending computer model for improved mine planning.	4, 11
3. Examination of sulphide dust explosions in Canadian mines.	1, 9
4. Development of a file of mine planning computer models compatible with the IBM-PC.	4, 11
5. Research on ceramic filters and their use underground to clean diesel exhaust.	5, 9
6. Development of PNET program for project scheduling.	1, 4
7. Completion of hoist design computer program for drum, friction and Blair hoists.	5, 9

P.D. Lawrence

Department of Electrical Engineering

1. Telerobot interfaces for machines operation (UBC). 11

Dr. H.D.S. Miller

1. Application of rock mechanics methods for the design of underground mines. 4, 10
2. Analysis of in-pit crushing and conveying in open pit mines as alternative to conventional truck/ shovel system. 4, 8
3. Shear failures during rockbursting. 10

A.L. Mular

1. Computer program for estimating capital& operating costs. 2, 11

A.J. Reed

1. Application of geostatistics to ore reserve estimations at the Venus Mine, Yukon Territory. 3
2. Universal kriging applied to mineral commodity price forecasting. 2
3. Economics of mining wollastonite. 2
4. Economics of mining zeolites. 2

University of Alberta
Department of Mining,
Metallurgical and Petroleum Engineering
606 Chemical-Mineral Building
EDMONTON, Alberta
T6G 2G6

Dr. Ken Barron
Professor
(403) 432-3810

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Design criteria for pillars in coal mines.	4, 10
2. Most likely tension crack position in plane shear slope failure.	4, 10
3. Outbursts at no 26 collieries, Glace Bay (Nova Scotia).	10
4. Size effects on the triaxial strength of coal.	10
5. The effect of sorption on the strength of coal.	10

J.D. Scott (403) 432-2636
Department of Civil Engineering

1. Core sampler for oil sands and heavy oil formations.	3
2. In-situ stress determination in oil sands by hydraulic fracturing.	11
3. Geotechnical properties of dredged clearwater clay-shale.	8
4. Large strain consolidation of oil sand tailings sludge.	8

University of Manitoba
Department of Geological Engineering
314 Engineering Building
WINNIPEG, Manitoba
R3T 2N2

Brian Stimpson
Professor and Head
(204) 474-8596

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Stability and rock bolting of layered strata.	10

University of Saskatchewan
Department of Geological Sciences
SASKATOON, Saskatchewan
S7N 0W0

D.J. Gendzwill

(306) 966-5703

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Natural and induced seismicity in Saskatchewan.	10
2. Development and implementation of an advanced microseismic monitoring system.	10
3. Three dimensional seismic reflection surveys from surface for potash mine planning.	10
4. Electromagnetic sounding system for strata control in potash mines.	10

Lakehead University School of Engineering Oliver Road THUNDER BAY, Ontario P7B 5E1	Dr. J.G. Locker Director (807) 345-2121

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
Dr. Inder Nirdosh	
1. Processes for obtaining environmentally safe uranium mill tailings.	3, 12
Henry North	
1. Low frequency cavitation processing.	11
2. Resonance grinding.	11
Dennis Roddy	
1. Sub-surface radar data analysis.	11

Laurentian University
School of Engineering
Ramsey Lake Road
SUDBURY, Ontario
P3E 2C6

Dr. D.E. Goldsack
Dean
(705) 675-1151

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Chemo-abrasive water jet cutting of rocks.	5, 11
Laxman M. Amaratunga	
1. Sulphide dust explosion in Canadian mines - A fine particle approach.	1, 9
Dr. D.A. Bakker (705) 675-1151 ext.2251 Dept. of Biology	
1. White finger disease prevention - Preliminary study.	1, 9
Dr. A. Farah	
1. Resin/cement grouted bolts in underground mining.	10
Dr. M. Hajdasinski	
1. Optimization of the size of drift and its practical application.	4
2. Analysis of the true rate of return project evaluation criteria.	1, 2
Dr. Michael L. Jeremic (705) 675-1151 ext.2250	
1. Ground destressing by camouflet blasting.	10
2. Stability analyses of rock salt mines (u/g and solution mining).	10

Peter K. Kaiser (705) 673-6517
Centre for Geomechanics Research

1. Conduct research related to rock engineering and ground control. 10

Dr. B. Kaye
Department of Physics

1. Design and testing of respirator efficiency. 5, 11
2. Fractal characterization of composite materials. 11
3. Fractal applications to fragmentation processes in the mineral industry. 11

Dr. J. Partyka

1. Scale model testing in mine ventilation design. 9
2. Spreadsheet application in air conditioning design. 9

Dr. L.D. Reed (705) 675-1151 ext.2236
Department of Physics

1. Investigation of light and charged particles emitted by rocks during fracture. 10, 11

Dr. S.P. Singh

1. Guidelines to controlled blasting underground using small diameter blast holes. 7, 10

D. Trotter

1. Underground mine lighting standards. 9
2. Guidelines for underground rail haulage. 8

Centre for Mining
and Mineral Exploration Research
Laurentian University
Ramsey Lake Road
SUDBURY, Ontario
P3E 2C6

Dr. A.E. Beswick
Executive Director
(705) 675-1151

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Mineral exploration applications of geobotanical remote sensing.	3
Dr. M.A. Alikhan	
1. Environmental metal residues in crustacean tissues.	3
Dr. Debra Bakker & Dr. Lloyd Reed	
1. White finger disease prevention - Preliminary study.	1
Dr. F.V. Clulow	
1. Radionuclides in mammals living in the drainage of uranium mine tailings.	3
Dr. M. Persinger	
1. An examination of rockburst related characteristics in the Sudbury basin.	10
Dr. G. Rubin/ Dr. M. Leach	
1. Hardrock fragmentation using sonic and ultrasonic resonances.	11
Dr. K. Westaway & Dr. D. Hallman	
1. The lifetimes and pathways of the PAH's and mutagens in dieselized underground mines.	1
K. Winterhalder & Dr. J.D. Shorthouse	
1. Soil nitrogent dynamics on industrially damaged and revegetated sites.	3

Queen's University
Department of Mining Engineering
Goodwin Hall
KINGSTON, Ontario
K7L 3N6

Peter Calder
Head
(613) 545-2196

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Pit slope stability studies.	4, 10
2. Control blasting.	7, 10
3. Open pit simulation studies.	2, 4
4. Microseismic emissions related to rock failure.	10
5. Computerized open pit feasibility and design.	2, 4

James F. Archibald (613) 545-2198

1. Development of microseismic monitoring networks for rockburst precursor detection and rapid in-situ stress assessment.	10
2. Evaluation of membrane barrier installations for retardation of radon gas inflows within mining/ residential environments.	4
3. Long term subsidence prediction in potash extraction operations based on field monitoring/ laboratory measurement/ computer modelling studies.	4, 10

Garston Blackwell (613) 545-2204

1. Open pit mine design and production scheduling using microcomputers and CAD systems.	4, 11
2. Underground stope layout and mine design using microcomputers and CAD systems.	4, 11

3. Automating surface and underground routine mine survey by interfacing to computer aided design and drafting systems on microcomputers. 9

4. Research on and installation of automatic survey slope monitoring systems using radio telemetry. 10

5. Photogrammetric analysis of pit slope and mine design and slope stability investigations using CAD systems on microcomputers. 10

6. Reconciliation of grade control and production statistics with geostatistically defined ore reserves and mineral inventories. 3, 4

Dr. K.R. Notley

1. Computer applications in underground mine design. 4, 11

Alan Bauer (613) 547-5821

1. Fragmentation control through blasting. 7

Charles W. Pelley (613) 545-2205

1. Continuous materials handling systems - Design and feasibility in medium sized hardrock mines. 4, 8

2. Studies in mine sequencing in deep narrow vein deposits to minimize stress induced ground control problems. 4, 10

3. Expert system for risk analysis in mine feasibility. 2, 11

Kenneth C. Wilson

Department of Civil Engineering

1. Improvement of the suspended-load component of the layered mechanistic slurry pipeline model using data for Western Canada coals and materials suitable for mine backfilling	8, 10

R.P Young (613) 547-2955

Department of Geological Sciences and Physics

1. Rock burst investigations using concurrent tomographic imaging and acoustic emission techniques.	10, 11
2. Seismic characterization of discontinuities and anomalous rock quality within mine surface crown pillars using attenuation and velocity imaging techniques.	10, 11

University of Toronto
Department of Civil Engineering
TORONTO, Ontario
M5S 1A1

Dr. A.M. Crawford
Professor
(416) 978-3115

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. The effectiveness of mine backfill in alleviating rockburst phenomena.	10

University of Waterloo
Department of Earth Sciences
WATERLOO, Ontario
N2L 3G1

Dr. Maurice B. Dusseault
Chairman, Geological Engineering
(519) 885-1211

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Behaviour of halite tailings as backfill.	10
2. Reclaimed strip mine subsidence.	3
3. Development of an Expert System for geophysical log interpretation.	3, 11
4. Geomechanics behaviour of Ontario oil shale.	10
5. Waste management for oil sands mines.	3
6. Engineering geology of western Saudi Arabia for road tunnels.	3
7. Constitutive behaviour of salt rocks.	10
8. Viscoplastic numerical model development.	10, 11
Dr. John Cherry	
1. Uranium tailings and groundwater.	3
Dr. John A. Franklin	
1. Digital photoanalysis of rock jointing.	10, 11
2. Thermoelastic expansion of rocks.	10
3. Extension of point-load test methods.	10
4. Flow in rock and concrete fractures.	3, 10

Dr. S.K. Frape

1. Deep brines in the shield. 3

Hubert George

1. Remote sensing for mine engineering geology. 3, 11

Dr. R.W. Gillham

1. Acid fluid generation from pyritic mine waste. 3
2. Protection covers for sulphide tailings. 3

M. Vidyasagar

1. Salt rock geomechanics for mine design. 4, 10

Collège de la région de l'Amiante
Centre spécialisé en
technologie minérale
671, boul. Smith S.
THETFORD-MINES, Québec
G6G 1N1

Réjean Nadeau
Directeur
(418) 338-8591

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Ensemencement des haldes minières à l'aide des boues d'une usine d'épuration.	3
2. Optimisation des circuits de production de la fibre d'amiante.	11, 12

École Polytechnique
Département de génie minéral
2500, rue de la Polytechnique
C.P. 6079, Succursale A
MONTRÉAL, Québec
H3C 3A7

P.B. Dubé

(514) 340-4555

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Traitement informatisé de relevés barométriques de pressions dans un réseau de ventilation.	9, 11
2. Modélisation informatisée de réseaux de ventilation pour les mines souterraines.	9, 11

Robert P. Chapuis (514) 340-4427

1. Influence du scellement sur le niveau d'eau fourni par un piézomètre.	3
2. Évolution des propriétés hydrauliques des agrégats routiers.	3
3. Interactions hydrauliques-mécaniques dans les essais de perméabilité en place : essais ponctuels et essais de pompage.	3, 11
4. Bilans hydrogéologiques dans un parc à résidus miniers.	3

J. Elbrond (514) 340-4923

1. Modélisation de la productivité d'une machine seule, de l'interaction homme-machine et d'un système de machines.	1
2. Perte de minerai et dilution par des stériles.	7
3. Optimisation des contours des exploitations à ciel ouvert.	4
4. Modélisation CAO des méthodes d'abattage pour simuler dilution et pertes de minerai.	7, 11

Denis E. Gill

1. Effet de l'historique de chargement avec la méthode convergence-confinement. 10
2. Essais de poinçonnement des parois latérales des trous de sonde. 10
3. Détermination des propriétés du sel gemme par essais dilatométriques. 10
4. Programme d'éléments finis pour la conception des mines. 4, 10
5. Évaluation du potentiel de coups de toît d'une mine. 4, 10
6. Prévision des effets de l'utilisation des rejets de sel comme matériau de remblayage sur l'affaissement de surface des mines de sel domal. 4, 10
7. Évaluation du potentiel du vérin Goodman dans les massifs élastoviscoplastiques. 5, 10
8. Analyse de stabilité de piliers de surface. 10
9. Adaptation de la technique du "Doorstopper" modifiée aux massifs de roches hétérogènes élastoviscoplastiques. 10

Dr. A. Piché (514) 340-4428

1. Automatisation de l'opération d'un brise-roches par rétroaction visuelle. 11, 5
2. Prévision des coûts de forage pour les exploitation minières souterraines. 2
3. Mise au point d'un système de télécommande en vue de l'opération de l'équipement minier souterrain sans visibilité du site de travail. 5, 11
4. Caractérisation des propriétés in-situ des remblais de mines. 10
5. Télésurveillance des chargeurs-transporteurs. 5, 11

Françcois Soumis (514) 340-4515

1. Logiciel d'affectation en temps réel des camions dans une mine à ciel ouvert. 8, 11

McGill University
Department of Mining and
Metallurgical Engineering
McConnell Engineering Building
3480 University Street
MONTRÉAL, Québec
H3A 2A7

Dr. Malcolm Scoble
Director of Mining
(514) 398-4374

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Mine backfill design and performance.	10
2. Monitoring machine breakage of rock.	5, 11
3. De-stress blasting design.	10
4. Tunnel probe drilling for poor quality ground.	10
5. Expert system development for mine design/control.	4, 11

Michel L. Bilodeau

1. Development of micro computer software to evaluate new mine investment proposals.	2, 11
2. Optimization of mine development and operating variables.	2, 11
3. Risk analysis in mining investments.	2
4. Simulation of mine operating decisions.	1, 2

Jeffrey Davidson (514) 398-4375

1. Integrated drill and shovel monitoring in surface coal mining.	7, 11
2. Small scale mining potential and policy options in selected African countries.	1, 2

3. Rehabilitation of old mines.	2, 3

F.P. Hassani

1. Rock-support interaction studies.	10
2. Development of new pack material for coal mines.	10
3. Acoustic emission technology applied to mining.	10, 11
4. Stability of gate roadways in underground coal mines.	4, 10
5. Paste backfill characteristics.	10

Yves Lizotte (514) 398-4374

1. A semi-automated truck dispatching system.	8, 11
2. Optimization of underground mine design.	4, 11
3. Simulation of underground haulage.	8, 11
4. Computerized open pit design.	4, 11

R.R. MacLachlan (514) 398-4376

1. Blast fragmentation studies.	3, 7
2. Ultrasonic surveying for improved drilling and blasting practices.	7, 9
3. Integration of blasting to stability, loading and transport.	7, 10
4. Evaluation of blasting and stability in cut and fill mining.	7, 10

Dr. Neil Rowlands (514) 392-5429

1. Quantification of mineral liberation using automated image analysis.	12

Université du Québec à Chicoutimi
Centre d'étude sur
les ressources minérales
555, boul. Université
CHICOUTIMI, Québec
G7H 2B1

G. Archambault
Directeur
(418) 545-5011

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Les études géotechniques de diverses natures sur les sols, les roches et les bétons.	10
2. Les expertises en géophysique appliquée et études séismiques.	10
3. Les analyses par différentes méthodes pour le contrôle des teneurs de minerais.	3
4. Simulation de zones de cisaillement par méthode statistique, éléments finis et modèle physique.	10
5. Hydrogéologie des exploitations minières au voisinage de zones de cisaillement.	3, 10
6. Modélisation de réacteurs en plasma pour l'extraction de minéraux.	11, 12
7. Modélisation écologique et environnementale en milieu aquatique pour la mise en valeur des ressources minérales.	2

Université du Québec
en Abitibi-Témiscamingue
42, Rhéaume Est
C.P. 700
ROUYN, Québec
J9X 5E4

Michel Aubertin

(819) 762-0971

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Étude du potentiel de coups de toît dans les mines de l'Abitibi.	10

Université Laval
Faculté des sciences et de génie
Département de mines et métallurgie
Cité Universitaire
SAINTE-FOY, Québec
G1K 7P4

Dr Pierre Choquet
Professeur génie minier
(418) 656-5273

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Development of a computer program for simulation of ore drawing in underground mining stopes.	7, 8
2. Instrumentation of cable-bolts in underground and open pit mines.	10
3. Improvement of subroutine DISCO (solving of principal stresses along discontinuity planes) to account for progressive failure, blasting effects and randomly distributed spacings and sizes of discontinuities.	4, 10
4. Mechanics of toppling failure in rock slopes.	10
5. Preparation of a "Technical guide for grouted cable-bolts used as ground support".	4, 10
6. Development and testing of a tension measuring gauge for cable-bolts used as ground support.	10, 11

Jean-Luc Collins (418) 656-2431

1. Influence de diverses variables, dont la prime au rendement, sur la productivité minière souterraine au Québec.	1, 2
2. Création d'une station CAO/DAO et intégration dans l'enseignement des techniques.	4, 11

Kostas Fytas (418) 656-5057

1. Comparaison entre deux méthodes d'analyse informatisée des réseaux de ventilation, notamment la méthode conventionnelle et la méthode thermodynamique. 9

2. Développement de systèmes experts pour la sélection de l'équipement dans les mines à ciel ouvert. 4, 11

3. Optimisation de la planification de la production des mines à ciel ouvert. 4

4. Simulation des systèmes pelles-camions. 5, 11

Technical University of Nova Scotia
Minerals Engineering Office
P.O. Box 1000
HALIFAX, N.S.
B3J 2X4

L.A. Adorján, Ph.D.
Professor and Director
(902) 429-8300

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Treatment of Pine Brook barite to obtain mud grade barite concentrate.	12
2. A study of pyrite liberation of Prince Coal by grinding in closed circuit with a classifier.	12
H.A. Hancock	
1. Investigation into cementatious properties of lead blast furnace slag.	10
D.S. Jones	
1. Investigate the use of Nova Scotia produced anhydrite as a monolithic mine support pack material in coal mines.	10
2. Full scale destructive testing of grout filled hollow structural steel mine support arch structures.	10
M.C. Rockwell	
1. Investigation of the caracteristics and properties of Nova Scotia oil shales.	2
Dr. F.A. Jerabek	
1. Blasthole cleaning and dewatering apparatus.	5, 9
2. Conceptual design of rock stabilizer and outline of testing procedure.	10

3. Conceptual design of a new method of achieving rigidity of ventilation duct after installation. 1, 9

4. Rock bolt for low seams. 10

5. Sealing of curb ring against the shaft walls. 5, 6

6. Narrow vein mining : conceptual design of new stoping method and mechanization of stoping operations. 5, 7

Occupational Health Group
B.C. Research
3650, Wesbrook Mall
VANCOUVER, B.C.
V6S 2L2

E.C. McDonald
Program Leader
(604) 224-4331

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Measurement of airborne dust concentrations and particle size fractions using area and personal sampling devices.	1, 9
2. Determination of gas concentrations on-site using sensitive continuous monitoring techniques.	1, 9
3. Presentation of education workshops on chemical handling, industrial hygiene and toxicology.	1, 9
4. Assistance on selection of respiratory protective devices and on set-up and administration of a respiratory protection program.	1, 9
5. Identification and size-fraction counting of biological contaminants such as mould and bacteria, in the workplace atmosphere.	1, 9
6. Measurement of the permeability of protective clothing to gases, vapours and liquids.	1, 9

Dr. Rod McElroy

Division of Extractive Metallurgy

1. Development of bioleaching technology for metal recovery from underground mine waste and backfill.	12

Manitoba Telephone Systems
MOBILE
P.O. Box 6666
1300 Ellice Avenue (CB19)
WINNIPEG, Manitoba
R3C 3V6

Dave C. Sloane
Engineering Services Manager
(204) 786-8933

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Underground handset communication system.	1
2. Computerized communication system on trucks in an open pit.	1, 11

Dynatec Mining Limited
10720 Yonge Street
P.O. Box 267
RICHMOND HILL, Ontario
L4C 3C9

John B. Scott, P.Eng.
Manager of Engineering
(416) 883-4022

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Computer program for estimating operating costs for underground mines.	2

The Mines Accident Prevention
Association of Ontario (MAPAO)
147 McIntyre Street W.
P.O. Box 1468
NORTH BAY, Ontario
P1B 8K6

W. Coughlan
Executive Director
(705) 472-4140

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Guidelines for underground rail haulage.	5, 8
2. The measurements of whole body vibration and its effects on underground load-haul-dump operators in underground mining environments.	1, 5
3. Loose detection devices.	10
4. Vibration dampening on hand held pneumatic rock drilling machines.	5
5. Resin/cement grouted bolts in underground mining.	10
6. Controlled blasting underground mining.	7, 10
7. Backfill quality control in underground mining.	8, 10
8. Underground mine lighting.	9

The Mining Industry
Research Organization of Canada (MIROC)
Commerce Court West, Suite 3350
P.O. Box 33
TORONTO, Ontario
M5L 1B3

R.D. Lord
Research Director
(416) 862-1417

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Report of evaluation of underground radio.	1
2. A new concept for air-powered underground mine lighting.	9
3. Successfully tested air flow helmet (featuring dust protection).	1, 5
4. Miner's worksuit made with a confortable water-resistant fabric.	1
5. New lightweight and highly protective workboot.	1
6. Mine ventilation monitoring system.	9
7. A 12 volts halogen cap lamp.	5
8. Noise abatement drills.	5
9. Vibration protection (hand-held drills).	5
10. Rock stress monitoring.	10, 11
11. Cable bolt grouting.	5, 10
12. Development of remote manipulation of a scanning device for mapping inaccessable openings.	5, 3
13. ANFO loading.	5, 7

Mining Research Directorate (MRD)
F523, Laurentian University
Ramsey Lake Road
SUDBURY, Ontario
P3E 2C6

Charles B. Graham
Managing Director
(705) 673-6595

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Mining research delivery agency database.	1

Mining Resource Engineering Ltd.
1555 Sydenham Road, RR#8
KINGSTON, Ontario
K7L 4V4

Dr. W.A. Crosby
Manager of Engineering
(613) 545-0466

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Preparation of computer program specifications for the mining industry.	11
2. Theoretical model for predicting low velocity impact sensitivity bubble of sensitized slurry explosion.	7, 11
3. Experimental verification of high velocity impact model for slurry explosives projectile impact.	11
4. Evaluation of propagation sensivity of commercial explosives in 15 cm diameter holes.	7
5. Computer blast design program evaluation for large diameter blasthole stopes.	7, 11

C. Mirza Engineering Inc.
170 Donway W.
Suite 410
DON MILLS, Ontario
M3C 2G3

C. Mirza
President
(416) 441-2560

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Sampling, field testing and modelling Les Mines Selbaie surface crown pillar.	10

J.S. Redpath Limited
P.O. Box 810
710 McKeown Avenue
NORTH BAY, Ontario
P1B 8K1

W.K. Seidler
Vice President, Engineering
(705) 474-2461

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Estimating the capital and operating costs of mining small mineral deposits by underground methods.	2
2. Redpath/Robbins shaft boring machine for boring shafts of 6 m to 7.3 m in diameter.	5, 6
3. Tunnel boring machine for boring tunnels of 2 m to 2.5 m in diameter.	5, 6
4. Winder-tensioner device for installing and tensioning hoist ropes.	5, 9

Teledyne Canada Mining Products
35 Elgin Street N.
P.O. Box 130
THORNBURY, Ontario
N0H 2P0

B. Pal
President
(519) 599-2015

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Determination of the technical viability of cavitating impact.	5, 11
2. Teledyne cogemacoustic ventilation fans.	9
3. DS-25 mobile scaler : a diesel powered unit mounted on an underground service vehicle chassis.	5, 7
4. Teledyne loadrite : a transducer measures the variances in hydraulic pressure from an empty bucket to a loaded bucket and a computer calculates the weight.	7, 11

Vadeko International Inc.
6535 Mill Creek Drive
Unit 62
MISSISSAUGA, Ontario
L5N 2M2

Z. Hershtal
Vice President
(416) 821-3222

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Development, construction and testing of prototype accessories for automation of DTH drills.	5, 11

Association des mines de
métaux du Québec
2, Place Québec
Suite 704
QUÉBEC, Québec
G1R 2B5

Dr. C. Drouin
Directeur général
(418) 525-4706

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Design of crown pillars.	4, 10
2. Influence des facteurs organisationnels sur la sécurité du travail.	1
3. Impact de divers paramètres quantifiables sur la productivité en souterrain.	1
4. Procédures de boulonnage.	10
5. Étude de l'impact des lois sur la santé et la sécurité du travail et la fréquence des réclamations à la CSST.	1

Machines Roger International inc.
1329, 4e avenue
VAL D'OR, Québec
J9P 1K5

Roger Masse
Président
(819) 824-9626

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE

Lucien Grenier (819) 825-4657

1. Excavation en continu de massifs rocheux de dureté variable tout en maximisant le principe de la foration plutôt que l'utilisation d'explosifs. 7, 11

Noranda inc.
Centre de recherche Noranda
Division de technologie minière
240, boulevard Hymus
POINTE-CLAIRE, Québec
H9R 1G5

J.H. Nantel
Gérant
(514) 697-6640

	PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1.	Optimization of underground stope blast design.	7, 4
2.	Final stage of the development and testing of an ultra sonic survey probe for determining the contours of inaccessible open stopes or other mine openings.	9, 11
3.	Development of novel ground monitoring instrumentation : recoverable stressmeter, holographic stressmeter and closure meter.	10, 11
4.	Development of a rock mechanics ground control field data base for use in mine design and modelling techniques.	10
5.	Construction of state-of-the-art microseismic system.	10, 11
6.	Conduct subsidence studies in potash mining areas.	3, 10
7.	Backfill studies of potash mines.	10
8.	Development of a continuous mining machine for hard rock formations.	5, 11
9.	Develop numerical modelling for mine design : primarily finite element methods and boundary element techniques will be used.	10, 11
10.	Ground support optimization.	4, 10
11.	Development of commercially viable instrumentation/computer systems for full wave microseismic source location and blast vibration monitoring.	10, 11
12.	To review hard materials and novel processes suitable for application in hard rock cutting and mining.	5, 11
13.	Remote control system and guidance system which would permit the operation of mining equipment without direct sight.	5, 11
14.	Mine electrification.	5, 9

Alberta Office of Coal
Research and Technology
Pacific Plaza, 2nd Floor
10909 Jasper Avenue
EDMONTON, Alberta
T5J 3M8

R.D. McDonald
Chairman
(403) 427-8042

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Technical and economic feasibility of using rock anchors to support a steeply dipping footwall.	2, 10
2. Surface geophysical coal exploration.	3
3. Obtention of more geotechnical and hydrogeological information from existing borehole logs by using data processing software developed for this purpose.	3
4. In-seam coal characterization.	3
5. Lasers in coal mining.	5, 11
6. Developing a cost-effective laboratory method of obtaining triaxial test data about the strength properties of rock and coal.	10
7. Robotics for mine control.	5, 11
8. Ground movements in coal mine.	10
9. Time-dependent behaviour of coal measure rocks.	4
10. Deformation and progressive failure of open pit highwalls.	10
11. Non-cable vehicle guidance.	5, 11

Alberta Research Council
Terrain Sciences Department
P.O. Box 8330
Station F
EDMONTON, Alberta
T6H 5X2

Dr. Mark M. Fenton
Manager, Land Resources Research
(403) 438-0555

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Highwall stability plains open pit coal mines.	2, 10

Coal Research Laboratories
CANMET
Energy, Mines and Resources
Surface Mining Laboratory
P.O. Bag 1280
DEVON, Alberta
T0C 1E0

D.B. Stewart
Manager, Mining Research
(403) 987-8238

	PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1.	Evaluation of an underground mine monitoring system.	1, 8
2.	A strategy for measuring off-highway rolling resistance.	5
3.	Truck management systems review.	5
4.	Developments in coal mine fire control.	1
5.	Off-highway truck selection in surface coal mining.	4, 5
6.	Alternative face cutting systems for longwall mining.	5
7.	A suggested method for estimating bolt lengths and loadings for support of rectangular openings.	10
8.	Development and validation of the truck and shovel computer model.	5, 8
9.	Productivity and equipment selection in surface mining of oil sands.	4, 5
10.	Blast casting.	3, 4
11.	Operations research (computer simulation and field data collection).	3, 4
12.	Equipment selection.	4, 5
13.	Geotechnical Engineering.	3, 10
14.	Spontaneous combustion.	3, 8
15.	In-situ oilsands recovery.	2, 12

Manitoba Department of Energy and Mines
Mines Branch
555-330 Graham Avenue
WINNIPEG, Manitoba
R3C 4E3

D.C. Cook
Project Coordinator
(204) 945-0491

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Overburden stabilization.	3
2. Secondary recovery of base metals by in place bacterial leaching.	12
3. Underground computer assisted design.	4, 11
4. Mine air/waste heat recovery.	9
5. Mining recording computerization.	11
6. Low cost stressmeter.	10
7. Evaluation of non-destructive testing of hoisting rope.	1, 5

Saskatchewan Research Council
Resources Processing
15 Innovation Boulevard
SASKATOON, Saskatchewan
S7N 2X8

J.T. Jones
Research Specialist
(306) 933-5400

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Potash rock mechanics instrumentation.	10
2. Large sample triaxial test facility.	10

Mining Research Laboratories
CANMET
Energy, Mines and Resources
555 Booth Street
OTTAWA, Ontario
K1A 0G1

Dr. J. Udd
Director
(613) 996-4570

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
Elliot Lake Lab.	
1. Investigating mine stability and rock burst activity in mines and study the effect on computer models of alternate mine layout and extraction rates.	4, 10
2. Evaluate the quality and quantity of respirable dust produced in various mining activities; determine the magnitude and sources of noise and vibrations and monitoring techniques and identification of major sources of radiation and factors affecting the radiation release.	1, 9
3. Developing methods to treat, dispose of and stabilize inactive tailings piles.	3
4. Evaluation of pillar stability on a local and regional scale in Canadian hardrock mines and determination of pre-mining stresses in rockburst-prone mines.	10
5. Develop new seismic equipment and monitoring techniques for studying rockbursts in hardrock mines and carry out seismic studies.	10, 11
6. Combined study of radiation, dust and ventilation.	1, 9
7. Identification and quantification of major sources of noise and vibration in mines.	1, 9

Explosives Atmospheres Lab.

1. Certify flameproof equipment, gas detectors and fire-resistant materials used in explosive atmospheres. 1

2. Demonstrate diesel emission control devices in both the lab and underground. 1, 5

3. Evaluate, in the lab, sensors for the continuous monitoring/detection of methane, diesel contaminant, ventilation and spontaneous combustion. 1

4. Characterization of explosion hazard ferro-silica. 1

5. Monitoring the continuing compliance of apparatus and materials certified by EMR and maintain a certification history of EMR certified products. 1

6. Participation in the development of standards related to apparatus and materials for use in gassy underground mines. 1, 5

Explosives Research Lab.

1. Confirm safety characteristics of all explosives; provide technical advice on explosive manufacture, storage and transport and investigate accidents. 1

2. Verifying proposed United Nations classification procedures for incorporation into the Explosives Act and Regulations. 1

Canadian Mine Technology Laboratory

1. Developing rock bolting guidelines based on the latest technological data and analytical results. 10

2. Carry out analytical numerical modelling studies as part of applied ground control investigations. 10, 11

3. Developing field and laboratory methods, equipment and procedures to assess the suitability of rock formations for high level radioactive waste containment. 3

4. Testing a side-viewing television camera for use in small diameter drill holes. 5, 11

5. Develop new ore reserve evaluation methodologies and the ore reserves of specific mineral deposits. 3

6. Supporting research to increase potash recoveries. 4, 10

7. Maintaining a databank on current and developing mining technology. 1, 9

8. Develop and evaluate mineability and economic criteria for hardrock mining. 2

9. Developing a handbook for the safe and economic design of surface crown pillars. 4, 10

10. Haulage automation for open pit mine with integration of blending requirements. 3

11. To establish the strength, deformational and other properties of the rock types encountered in research investigations and to evaluate rock mass stability for surface crown pillars. 10

Contract Research

1. Theorical model for predicting low velocity impact sensitivity bubble sensitized slurry explosion (Mining Resource Engineering Limited). 7, 11

2. Experimental verification of high velocity impact model for slurry explosives projectile impact (Mining Resource Engineering Limited). 7, 11

3. Evaluation of propagation sensitivity of commercial explosives in 15 cm diameter hole (Mining Resource Engineering Limited). 7, 11

4. To carry out field and laboratory testing, field measurements and numerical modelling of excavations in potash (Cominco Limited). 10, 11

5. Estimated preproduction and operating costs of mining small mineral deposits by underground methods (J.S. Redpath Limited). 2

6.	Development, construction and testing of prototype accessories for automation of down-the-hole drill (Vadeko International).	5, 11
7.	Determination of the viability of cavitating hydro impact (UP-T-223) (Teledyne Canada).	5, 11
8.	Self instruction teaching package for the design and application of perimeter blasting in open pit mines (Queen's University).	1, 4
9.	Regional subsidence related to potash mining (Central Canada Potash).	10
10.	Research on microseismic technology (McGill University).	10
11.	Sampling, field testing and modelling of a surface crown pillar, Les Mines Selbaie, Québec (C. Mirza Engineering).	10
12.	Development of a state-of-the-art microseismic monitoring system (UP-N-204) (Noranda Research Centre).	10, 11
13.	GEOROC : Technology transfer seminars for the potash industry (Re/Spec Limited).	1, 11
14.	Design and development of blasthole depth measurement test set (Davis Engineering Limited).	7, 11
15.	The development of a new semiconductor Alpha Portable Detection System (UP-T-234) (Thompson & Neilson).	11
16.	Determination of the PAH partition ratio and nature of mutagens generated by catalytic purifiers (Laurentian University).	11
17.	Computer blast design program evaluation for large diameter blasthole stopes underground (Mining Resource Engineering Limited).	7, 11
18.	Examination of the 100% methanol or pilot diesel methanol engine as a power source for underground mines (Inco Limited).	5
19.	Development of wire mesh particulate oxidizer traps using full additives (UP-E-183) (Engine Control Systems).	5
20.	Compilation of systems development and adaptation phase of CANMET diesel emissions reduction (Part III) (Ontario Research Foundation).	5

21. Determination of turbulence effects on the severity of dust-air explosions (McGill University). 1

22. Examination of impact of polynuclear aromatic hydrocarbon explosion in underground mines (McMaster University). 1

Mineral Development Agreements

CANMET is the lead agency in Mineral Development Agreements, joint ventures of the Federal Government, mining companies and provincial governments, undertaken to support the mining industry. The agreements, supporting research and technology projects, acknowledge the importance of mining to the nation. A total of$5,213,000 has been committed in agreements with four provinces and negotiations are currently underway in other areas to work out the details of projects worth approximately$1,000,000. All the committed money is to be spent over the next three years on projects to meet specific problems in mines in various provinces (and by the provinces government).$1,862,000 of the money is budgeted to be spent in the current fiscal year.

Ententes fédérale-provinciales

CANMET est le principal coordonnateur des Ententes fédérale-provinciales. ces plans conjoints du Gouvernement fédéral, des compagnies minières et des gouvernements provinciaux, afin de rendre l'industrie minière plus compétitive. Les ententes, générant des projets de recherches et de développement, reconnaissent l'importance des mines à l'échelle nationale. Un total de$5,213,000 a été octroyé dans quatre provinces et des négotiations sont présentement en cours pour définir les détails de projets évalués approximativement à$1,000,000. Toutes les sommes accordées doivent être dépensées par les provinces au cours des trois prochaines années sur des projets devant répondre à des problèmes spécifiques de leurs mines. Au cours de la présente année fiscale, $1,862,000 du budget doitêtre dépensé.

Ministry of Labour
Mining Health and Safety Branch
400 University Avenue, 7th Floor
TORONTO, Ontario
M7A 1T7

V. Pakalnis
Director
(416) 965-1328

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Evaluation of ultrasonic rockbolt tester.	10
2. Joint CANMET/MOL/Industry rockburst research program.	10
3. Evaluation of installed wire mesh screening.	10
4. Rockbolt testing and audits.	10
5. Wire rope technology.	10
6. Men and material hoisting.	9
7. Diesel emissions in underground mines.	5, 1
8. Bulk mining study.	4
9. Mine shaft rope test instruments.	9
10. Mine shaft loading pockets.	8

Centre de recherches minérales
Ministère de l'Énergie
et des Ressources
Complexe Scientifique
2700, rue Einstein
SAINTE-FOY, Québec
G1P 3W8

Denis Côte
Chef du STM
(418) 643-4504

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Développement de la foreuse Roger : essais à la mine Bousquet.	5, 7
2. Les propriétés physiques et mécaniques des remblais souterrains et leur influence sur la conception des chantiers souterrains (M.J. Scoble-McGill).	4, 10
3. Conception des piliers de surface à la mine Chimo.	4, 10
4. Accroissement de la productivité par l'amélioration du fonctionnement des équipements de hissage dans les mines souterraines.	8, 9
5. Application de la géostatistique à un modèle tridimensionnel et son transfert technologique à l'UQAT.	3
6. Étude de la stabilité à la mine Niobec.	10
7. Stabilité des massifs rocheux à la mine Tio.	10
8. Mise en opération de divers logiciels en ventilation minière.	9, 11
9. Guide d'ingénierie pour la conception des piliers de surface.	10
10. Développement d'un programme d'arpentage.	9
11. Logiciels de modélisation numérique pour le calcul des contraintes autour des excavations.	10, 11
12. Conception de patrons de sautage.	4, 7
13. Développement d'un système de planification par graphisme interactif 3-D.	4, 11

14. Analyse de stabilité des talus.	10
15. Procédures de mesure des contraintes dans les massifs rocheux.	10
16. Programme Inclino.	10, 11
17. La restauration des parcs à résidus miniers.	3
18. État sommaire de la question sur la mesure des déplacements par extensomètres.	10
19. La modélisation numérique de la géologie et la minéralisation de la zone S-3 des Mines Camchib Inc.	3, 11
20. Développement d'un système de télécommande sans vision directe de l'opérateur.	9, 11
21. Développement d'un logiciel de planification minière assistée par ordinateur.	2, 11
22. Étude de stabilité des chantiers de la zone S-3 des Mines Camchib Inc.	10
23. La modélisation numérique de la géologie et la minéralisation du projet Djebba en Tunisie.	3, 11
24. Introduction à la mécanique des treuils.	9
25. Modélisation numérique et validation d'un gisement géologique (QIT).	3, 11
26. Gestion informatisée des titres miniers.	1, 11
27. Guide du boulonnage condensé.	10
28. Mise en service, vérification et études techniques des machines d'extraction.	9
29. Alternative au sautage secondaire.	7
30. Influence de diverses variables, dont la prime au rendement, sur la productivité minière souterraine.	2, 4

31. Détermination des paramètres des structures rocheuses à la mine Tio.	3
32. Guide des techniques d'évalution des gisements d'or.	3
33. Étude de cas en conception et planification de fosse à ciel ouvert avec le logiciel PC-Mine.	4, 11
34. Projet de télémétrie dans les mines.	9, 11
35. Répertoire des équipements miniers dans le monde.	5
36. Étude de la fatigue des câbles de machines d'extraction.	9
37. Guide technique du soutènement par câbles d'ancrage cimentés.	10

Coal Research Laboratories
CANMET
Energy, Mines and Resources
Cape Breton Coal Research Laboratory
210 George Street
SYDNEY, N.S.
B1P 1J3

G.A. Haslett
Group Leader
(902) 564-7673

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Subsidence.	10
2. Methane prediction and control.	4, 9
3. Dust control.	4, 9
4. Ventilation performance.	4, 9
5. Water jet assisted cutting.	5, 11
6. Roadway / gateroad support.	10

Occupational Health
and Safety Commission
P.O. Box 6000
500 Beaverbrook Court
FREDERICTON, N.B.
E3B 5H1

K.E. Daniel
Manager, Mine Safety
(506) 453-2467

PROJECT TITLE TITRE DU PROJET	CATEGORY CATÉGORIE
1. Evaluation of non-destructive hoist rope testing equipment.	5, 9

SECTION 2

Projects Listed by Categories

Liste des projets par catégorie

MINE INDEX CATEGORIES

1. ADMINISTRATION : Mine Administration includes manpower training and development, health and safety of employees, management organization, voice communication, data communication, remote monitoring and labour relations.

2. FEASIBILITY : Mine Feasibility includes economic studies, mine evaluations, cost estimations and other projects undertaken to determine the potential success of major capital expenditures to develop a new mine, rehabilitate an old mine or expand an existing mine for increased production or better productivities.

3. SURFACE TECHNOLOGY : Surface Technology includes prospection, exploration, sampling, modelling, geostatistics, hydrology and geotechnology. It will also include projects dealing with environmental subjects, waste management, dewatering and other site work such as roads, bridges, damns and runways.

4. DESIGN : Mine Design includes selecting stope and pillar patterns and mining methods for new mines or for existing operations that are to be modernized or expanded. The category also includes planning, scheduling and grade control.

5. EQUIPMENT : Equipment includes equipment design, selection and maintenance as well as installed and consumable supplies.

6. DEVELOPMENT : Development includes methods of advancing mine and stope access headings leading to the fragmentation and removal of the muck to the haulage system.

7. PRODUCTION : Stoping includes operational topics such as fragmentation, blast pattern design, drilling methods, explosives and all other matters connected to preparing a block of ore, either a stope or a pillar, for drilling and blasting and removal of the fragments to the haulage system.

8. MATERIALS HANDLING : Materials Handling includes the movement of fragmented material, from stope or development heading, via loading/transportation systems, grizzlies, rock-breakers, ore passes, crushers, surge and storage bins and loading pockets to surface.

9. SERVICES : Mine Services include ventilation, surveying, compressed air, dewatering systems, air heating, hoisting plant (hoist, headframe, shaft conveyances and all shaft installations) and electrical supply, control and distribution.

10. GROUND CONTROL : Ground Control includes rock mechanic studies, ground support mechanisms and ground support preparation, placement and installation.

11. HIGH TECH : High Tech includes computers, robotics, water jets or other new and innovative topics.

12. PROCESSING : Processing includes general milling operations, mill recoveries, concentrate grades, reagent consumption etc. as well as in-situ and heap leaching operations on surface or underground, and recovering economic values from tailings and waste dumps.

CATÉGORIES DU RÉPERTOIRE

1. ADMINISTRATION : Inclut l'entraînement du personnel, santé et sécurité des employés, communications orales, transmission de données et relations de travail.

2. FAISABILITÉ : Comprend les études économiques, évaluation minière, estimation des coûts et autres projets entrepris afin de déterminer le succès potentiel d'un investissement majeur pour développer un nouveau gîte, réouvrir une ancienne mine ou l'expansion d'une mine déjà existante afin d'accroître la production ou la productivité.

3. TECHNOLOGIE DE SURFACE : Prospection, exploration, échantillonnage, modélisation, géostatistique, hydrologie et géotechnologie. Comprend également les projets touchant l'environnement, disposition des résidus miniers, drainage et autres travaux de surface tels: routes d'accès au site, ponts et digues.

4. CONCEPTION : Inclut la configuration des chantiers et piliers et les méthodes de minage pour des nouvelles mines ou pour des opérations à moderniser ou expansionner. Cette catégorie inclut en plus les activités de planification, cédulation et ajustement des teneurs.

5. ÉQUIPEMENT : Inclut la conception, la sélection et l'entretien d'équipement mobile ou stationnaire et pièces.

6. DÉVELOPPEMENT : Méthodes de développement des accès dans la mine et aux chantiers, et moyens de briser et évacuer la roche dans le système de halage.

7. PRODUCTION : Inclut les opérations de minage telles: fragmentation, conception de patrons de sautage, méthodes de forage, explosifs et autres opérations reliées à la préparation d'un bloc de minerai pour forage, sautage et manutention du matériel dans le système de halage.

8. MANUTENTION DES MATÉRIAUX : Inclut le mouvement du roc fragmenté à partir des chantiers ou ouvrages de développement, via systèmes de transport/chargement, grizzlis, marteaux pneumatiques, cheminées à minerai, concasseurs, silos à minerai et points de soutirage jusqu'en surface.

9. SERVICES : Ventilation, arpentage, air comprimé, système de drainage, chauffage de l'air, chambre de treuil (treuil, chevalement, installations du puits), système de distribution et contrôle électrique.

10. SOUTÈNEMENT: Inclut les études en mécanique des roches, soutènement minier, préparation au soutènement et installation du soutènement.

11. TECHNOLOGIE DE POINTE : Inclut l'utilisation des ordinateurs, la robotique ainsi que tout autre sujet d'innovation.

12. MINÉRALURGIE : Inclut le traitement en général: récupération, teneur des concentrés, consommation de réactifs, etc. Comprend également la lixiviation en place ou en tas à la surface ou en souterrain, de même que la récupération de valeurs économiques contenues dans les haldes de stériles et bassins de résidus.

1. ADMINISTRATION

PROJECT TITLE TITRE DU PROJET	PAGE
1. Measurement of the permeability of protective clothing to gases, vapours and liquids.	93
2. Identification and size-fraction counting of biological contaminants such as mould and bacteria, in the workplace atmosphere.	93
3. Assistance on selection of respiratory protective devices and on set-up and administration of a respiratory protection program.	93
4. Presentation of education workshops on chemical handling, industrial hygiene and toxicology.	93
5. Determination of gas concentrations on-site using sensitive continuous monitoring techniques.	93
6. Measurement of airborne dust concentrations and particle size fractions using area and personal sampling devices.	93
7. Development of PNET program for project scheduling.	66
8. Examination of sulphide dust explosions in Canadian mines.	66
9. Underground computer terminals for shift boss reporting.	10
10. Leaky cable underground communication system.	10
11. Develop a lift check device to lock scooptram dump and roll cylinders.	10
12. Introduction of fire resistant hydraulic fluids.	10
13. Coal dust suppression at the thermal dryer using chemical sprays.	7
14. Evaluation of non-destructive testing of hoisting rope.	110
15. Verifying proposed United Nations classification procedures for incorporation into the Explosives Act and Regulations.	113

PROJECT TITLE TITRE DU PROJET	PAGE
16. Confirm safety characteristics of all explosives; provide technical advice on explosive manufacture, storage and transport and investigate accidents.	113
17. Certify flameproof equipment, gas detectors and fire-resistant materials used in explosive atmospheres.	113
18. Monitoring the continuing compliance of appartus and materials certified by EMR and maintain a certification history of EMR certified products.	113
19. Characterization of explosion hazard ferro-silica.	113
20. Evaluate, in the lab, sensors for the continuous monitoring/detection of methane, diesel contaminant, ventilation and spontaneous combustion.	113
21. Participation in the development of standards related to appartus and materials for use in gassy underground mines.	113
22. Demonstrate diesel emission control devices in both the lab and underground.	113
23. Evaluate the quality and quantity of respirable dust produced in various mining activities.	112
24. Identification and quantification of major sources of noise and vibration in mines.	112
25. Determine the magnitude and sources of noise and vibrations and monitoring techniques and identification of major sources of radiation and factors affecting the radiation release.	112
26. Maintaining a databank on current and developing mining technology.	114
27. Combined study of radiation, dust and ventilation.	112
28. Evaluation of pillar stability on a local and regional scale in Canadian hardrock mines and determination of pre-mining stresses in rockburst-prone mines.	112

PROJECT TITLE TITRE DU PROJET	PAGE
29. Examination of impact of polynuclear aromatic hydrocarbon explosion in underground mines (McMaster University).	116
30. Determination of turbulence effects on the severity of dust-air explosions (McGill University).	116
31. Self instruction teaching package for the design and application of perimeter blasting in open pit mines (Queen's University).	115
32. GEOROC : Technology transfer seminars for the potash industry (Re/Spec Limited).	115
33. Underground radio communications.	41
34. Direct data entry by front line supervisor.	41
35. Phase II of a project to improve underground communication.	35
36. The measurements of whole body vibration and its effects on underground load-haul-dump operators in underground mining environments.	96
37. Miner's worksuit made with a confortable water-resistant fabric.	97
38. New lightweight and highly protective workboot.	97
39. Report of evaluation of underground radio.	97
40. Successfully tested air flow helmet (featuring dust protection).	97
41. Experiences with a remote fly-in mining operation.	28
42. Diesel emissions in underground mines.	117
43. Modélisation de la productivité d'une machine seule, de l'interaction homme-machine et d'un système de machines.	82
44. Influence de diverses variables, dont la prime au rendement, sur la productivité minière souterraine au Québec.	89

PROJECT TITLE TITRE DU PROJET	PAGE
45. Simulation of mine operating decisions.	85
46. Small scale mining potential and policy options in selected African countries.	85
47. Remote surveillance of plant entrances.	43
48. Sous-programme d'ordinateur (intégré au programme actuel) pour suggérer au répartiteur la destination optimale d'un camion libre dans une mine à ciel ouvert.	45
49. Développement de grades d'amiante chrysotile de remplacement.	45
50. Programme de gestion et de contrôle de l'usine des rails.	61
51. Communication systems for underground workers.	47
52. Gestion informatisée des titres miniers.	119
53. Impact de divers paramètres quantifiables sur la productivité en souterrain.	104
54. Influence des facteurs organisationnels sur la sécurité du travail.	104
55. Étude de l'impact des lois sur la santé et la sécurité du travail et la fréquence des réclamations à la CSST.	104
56. Pay scheme, based on training and job rotation, of the man carrying the rate not the job.	65
57. Install and commission u/g radio communication.	37
58. Developments in coal mine fire control.	109
59. Evaluation of an underground mine monitoring system.	109
60. Communication system for isolated areas in mines.	25

PROJECT TITLE
TITRE DU PROJET PAGE

61. Conceptual design of a new method of achieving rigidity of ventilation duct after installation. 92

62. Bavettes sur foreuses de 4.5 pouces de diamètre pour réduire le brouillard. 52

63. Modification des sièges et suspension sur les chargeuses-navettes et camions de halage pour prévenir les maux de dos. 52

64. Amélioration du système de lumière de circulation dans les rampes. 52

65. Analysis of the true rate of return project evaluation criteria. 72

66. Sulphide dust explosion in Canadian mines - A fine particle approach. 72

67. White finger disease prevention - Preliminary study. 72

68. Underground handset communication system. 94

69. Computerized communication system on trucks in an open pit. 94

70. White finger disease prevention - Preliminary study. 74

71. The lifetimes and pathways of the PAH's and mutagens in dieselized underground mines. 74

72. Mining research delivery agency database. 98

73. Development of a mine services software system. 62

2. FEASIBILITY / FAISABILITÉ

PROJECT TITLE TITRE DU PROJET	PAGE
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Any comments about this document sent in by readers will be appreciated and will be examined prior to compiling future issues.

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4	Design Conception	5	Equipment Équipement	6	Development Développement
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